

Article

Early Childhood Preservice Teachers' View of Socio-Environmental Problems and Its Relationship to the Sustainable Development Goals

Fátima Rodríguez-Marín ^{1,*}, María Puig Gutiérrez ¹, Lidia López-Lozano ² and Alicia Guerrero Fernández ¹

¹ Department of Science Education and Social Science Education, Faculty of Education, University of Seville, 41013 Seville, Spain; mpuig@us.es (M.P.G.); aliciaguerrero@us.es (A.G.F.)

² Department of Integrated Didactics, Faculty of Education, Psychology and Sports Sciences, University of Huelva, 21007 Huelva, Spain; lidia.lopez@ddi.uhu.es

* Correspondence: frodmar@us.es

Received: 17 July 2020; Accepted: 31 August 2020; Published: 2 September 2020



Abstract: In the face of the socio-environmental crisis in which we are immersed, the initial training of teachers must assume the work in favor of a critical, committed, participatory citizenry capable of responding to the socio-environmental problems of the current and future world. The analysis of the initial 61 research projects on socio-environmental problems of four classes involving 240 students of the Degree in Early Childhood Education at the University of Seville (Seville, Spain) is presented. Under an interpretive descriptive approach according to a category system based on the Sustainable Development Goals (SDGs) established by the UN (2015) and its targets, we can learn about their socio-environmental concerns and how they relate to the current 2030 Agenda. We obtain that of the 17 SDGs, around half of the final 42 research projects analyzed focus on sustainable consumption and project patterns and climate change, while problems related to poverty, hunger, or peace do not arise. In addition to allowing us to draw a portrait of the socio-environmental concerns of early childhood preservice teachers, the data obtained also gave us the opportunity to ponder the didactic possibilities that these types of formative activities bring to the training of teachers who are critical and committed to transforming the world.

Keywords: socio-environmental crises; sustainable development goals; early childhood preservice teachers; interpretive descriptive methodological approach; socio-environmental concerns; socio-environmental problems; didactical implications

1. Introduction

Many are the authors who point out that we live in an eco-social crisis of planetary proportions [1–3]. The causes of this crisis are multiple and are the result of a variety of interrelated factors, amongst them the following stand out: the accelerated demographic growth unevenly distributed among the world's regions and their levels of development; the overexploitation of resources; the uncontrolled economic growth; and the misconceptions in respect of the relationship between nature, man, and society. This undoubtedly shows the influence of human activity on the biosphere and its impact on the limits of our planet [4]. From this perspective, the environmental problems that affect our planet are not considered independent of social problems; they both are two sides of the same coin. Thus, problems that are more environmental or ecological in nature end up directly affecting society that, in turn, is involved in its causes and consequences. Similarly, problems with a more social nature are not independent of the environment in which they develop, but rather interact with and are affected by it,

all the while affecting it. For this reason, we refer to socio-environmental problems to emphasize the interaction and complementarity between their social and environmental aspects [5,6].

In 2015, the UN approved the so-called 2030 Agenda for Sustainable Development, which contains 17 Sustainable Development Goals (SDGs) that seek to overcome the current situation of socio-environmental crisis. However, as Meira emphasizes, the fundamental concept of limits is missing [7]: “When considering the environmental sustainability of development, the Agenda that defines the SDGs does not mention the fundamental limits of the biosphere and growth always appears as the central concept throughout the document” (p. 66). Therefore, “growth is considered the expression and premise of human development; intrinsically, it is assumed that, without growth, it will be impossible to eradicate poverty and generate well-being; without growth, it will be impossible to have sufficient resources—technological, cultural, and economic—to achieve a sustainable management of the biosphere” [7] (p. 59). Still, despite the stubborn belief in the indissoluble association between growth and development and the resistance to accepting that there are biophysical limits to growth, environmental sustainability is gaining momentum. In fact, 7 of the 17 objectives that constitute the new Agenda (SDGs 6, 7, 11, 12, 13, 14, and 15), which is more than a third of the total, are directly linked to environmental sustainability. Therefore, we must take into account the limitations of this document.

Likewise, the latest report that analyses the degree of achievement of the SDGs in 2020 shows that “One third of the way into our SDG journey, the world is not on track to achieve the global Goals by 2030. Before the COVID-19 outbreak, progress had been uneven, and more focused attention was needed in most areas. The pandemic abruptly disrupted implementation towards many of the SDGs and, in some cases, turned back decades of progress” [8] (p. 3).

According to the analyzed data, there is no region or sector of the world that has not been affected by the pandemic; forecasts indicate that the pandemic will set 71 million people back into extreme poverty, rising global poverty for the first time since 1998. Regarding education, for instance, school closures kept 1.57 billion students at home causing over 370 million children to miss out on school meals this spring alone. The economic impacts of the crisis are equally alarming with the world facing its worst recession in generations. It is a critical period in which to advance a common perspective and accelerated responses to the world’s most serious challenges, from the elimination of poverty and hunger to the fight against climate change. However, “Our collective response to the pandemic can serve as a ‘warm-up’ for our preparedness in preventing an even larger crisis—that is, global climate change, whose effects are already becoming all too familiar” [8] (p. 3).

Considering this context, a change of perspective and a citizenry truly committed to the future of our planet are an inescapable necessity. If we do not become aware of the real scenario in which we find ourselves, if we do not stake ourselves on a change in the organization of the current system, the effects listed above are bound to be irreversible. Thus, we consider that the commitment to the training of critical and dedicated citizens is essential [9] and it requires the search for strategies and resources capable of guaranteeing an education aimed to create citizens of the world capable of undertaking changes and improvements in politics, economy, technology, and education while also taking into account that they live in a globalized context that, as such, requires global responsibility [10].

Education is a key tool since it can change how people see the world and face the challenges of sustainability [11]. For that to happen, higher education needs to become an essential pillar to face these challenges, so much so that the institutions that teach it must intensify their commitment to this cause [12].

Despite the complexity and difficulties that arise when tackling these challenges, they can become an optimal context to train students and to generate synergies and interactions within universities among different academic degrees and between universities and society, which is something that will imminently require a reform of the curricula [13].

Therefore, universities should train their students for lives as responsible citizens, instead of focusing solely on professional training. Spanish universities, through recommendations of the CRUE-Sustainability sectoral commission, have reference documents for the integration of sustainability

into their curricula that also offer guidelines for the incorporation of the SDGs [14]. In line with other studies [15], “it is not about merely knowing the socio-environmental problems and the great challenges, it is about being prepared for them and having the opportunity to stop, limit, mitigate and/or prevent their negative impacts taking action from a professional standpoint” (p. 14). Thus, among the principles and objectives of these institutions, we usually find the commitment to promote social transformation and critical citizenship. In the specific case of the University of Seville, we can see how the fifth principle of its statute says, “It is the duty of the university community to comply with these principles and give them effect, promoting free and critical thinking and research, so that the University of Seville can be an effective instrument for social progress and transformation” and in its last base objective refers to “the encouragement and training of its members for the exercise of critical thinking, caring and responsible citizenship” [16] (p. 10).

However, the fulfillment of these recommendations, while being within reach in the university environment, in the classroom is not very significant. In this regard, we agree with other studies [17] that their application should be transferred to the planning and development of concrete educational practices that facilitate changes in individuals’ mentality and behavior. However, it seems that this transition is not straightforward: the concept of sustainability, which supports and nucleates this perspective, is very polysemic and ambiguous. Critics argue that, by not questioning the economic bases of the growth-based social model [18], there is no clear social positioning and, in this sense, they observe that the actions undertaken under the banner of sustainability have had little success in promoting a social change [19] that is truly necessary in the current global situation. This approach requires the formulation of alternative versions of the objectives contained in the SDGs, since concepts like “degrowth” or “environmental education for sustainable degrowth” are not found in the official documentation of the United Nations system, nor in declarations and programs [6]. Adjusting to this global situation involves developing educational responses that encourage autonomy and self-sufficiency; that enhance understanding of the world, research capacity, and collaborative work; and that mature a critical eye and environmental literacy based on knowledge rather than mythical thinking.

The connection of preservice teachers with global socio-environmental problems stands as a key element to develop and favor teaching responses that are concordant with the current situation [20]. As such, without losing sight of the limited knowledge that students have on socio-environmental issues [21], it is essential to give to preservice teachers the opportunity to research these problems and help them find a way to approach them from a didactic perspective in a way that fosters critical thinking, makes them aware of the current situation, and helps them approach their future profession improving it [11,22,23].

Under these premises, we present the results of a study, carried out on third-year students of the Degree in Early Childhood Education at the University of Seville, that aims to understand their socio-environmental worries and concerns and how these concerns connect with the current 2030 Agenda.

2. Materials and Methods

2.1. Research Context

We present the analysis of 61 research projects on socio-environmental problems of four classes involving 240 students of the Degree in Early Childhood Education at the University of Seville (Seville, Spain). Our research originates from a classroom activity handed out to the students of the compulsory subjects “Knowledge of the Social Environment” and “Teaching the Natural Environment to Age Groups of 0 to 6 Years” during academic years 2018/19 and 2019/20; both these subjects belong to the 3rd year curriculum and are developed in coordination with one another. Among their main objectives are for the preservice teachers to know the area of environment knowledge of the early childhood education curriculum (from 0 to 6 years of age), to approach and implement a globalized

research methodology on the environment, and to know the basic learning processes of children in early childhood education courses in relation to the environment and to reflect on the consequent didactic implications.

This activity corresponds to the first part of the first unit of these subjects, which is dedicated to inquiry processes and environmental problems. In it, we proposed that students, organized in groups of four to six components, develop a school research project on a socio-environmental problem that they consider relevant—a research project that, despite the limitations inherent in the context in which it is carried out, should not lack hypotheses or questions, should contain a certain fieldwork, and ought to be rigorous. The students had to consult sources and had the possibility of communicating their findings and conclusions to the class. We started by proposing a debate around what we can consider a socio-environmental problem and the members of each group agreed on a topic according to their interests, concerns, and/or research development viability. Their works were prepared following a guide for the development of a research project that contained these three landmarks:

1. Definition of the problem and justification of the interest it had for the group.
2. Description of each step taken or activity carried out during their research.
3. Conclusions achieved both regarding the actual research results and regarding the working procedures that were followed. The conclusions regarding the results had to be presented synthetically for each problem.

We allotted eight class sessions for the development of this activity; during each session, the teachers acted as guides under the Inquiry-based Science Education (IBSE) teaching–learning approach [24] advising the groups, resolving doubts, and guiding the development of the works. As one can appreciate, the landmarks were left quite open so that the students themselves could discover and build the steps and instruments that constituted their research projects.

All groups began by defining a problem-question which they had to answer. Then, they discovered how they should proceed, what resources they needed, and how they should organize themselves in order to reach the answer. Once the works were completed, sharing was carried out where each group presented, to the rest of the class, their research and the conclusions they found regarding the question that they posed. At the end of each presentation, a question or feedback session about the work done was opened. After all the projects were presented, together, we determined the phases of a school research project and discussed the advantages and disadvantages of research projects. Once this first activity was carried out, we presented the SDGs to the students and began to work on them. Therefore, during the development of the work that we describe in this article, the students had yet to deal with them.

2.2. Methodology

In order to learn about the socio-environmental concerns of these preservice teachers and how their concerns are tied to the current 2030 Agenda, we analyzed the 61 topics that they decided to research under an interpretive descriptive methodological approach [25], according to a system of categories and subcategories based on the SDGs established by the UN (2015) (Figure 1) and their targets. We clarify that SDG 17 was not considered for topic classification due to its very nature since it agglutinates the previous ones referring to their achievement.

We used, as the basis for the process of analysis and categorization of these works, the achievement of inter-judge agreements in two phases. Codifications were modified and reformulated until the authors of this paper reached a consensus. During the first phase, after a first reading, we found a discrepancy of 8.2% (5 works); we then discussed each topic and its possible link to the SDGs in order to achieve a 100% agreement. In this phase, we accepted all the works that presented topics established in the SDGs, leaving to the second phase the task of refining the codification using the SDG targets as a subcategory. Therefore, only those works that were in line with some of the targets of the SDGs could

move to this second phase. This process allowed us to deepen the analysis. Thus, in the second phase, after another process of inter-judge negotiation, 19 projects were discarded (31.15% of the initial works).



Figure 1. List of the 17 Sustainable Development Goals (SDGs). Source: 2030 Agenda, UN (2015). [26].

3. Results

We started our analysis with 61 student research projects. These works raised socio-environmental issues regarding 13 of the SDGs presented in Figure 1 leaving unmentioned those related to the problems of poverty, hunger, and peace (SDGs 1, 2, and 16, respectively). Figure 2 shows the distribution of these projects in each phase of the categorization process; during phase 1 we categorized the works linking each of them to an SDG and in the 2nd phase we only kept those that were actually responding to a target contemplated in the SDG to explain their research focus (i.e., phase 2 increases the level of finesse of the analysis by introducing the subcategory "targets"). This resulted in 42 research projects categorized by SDG with an approach focused in accordance with one or more of its targets.

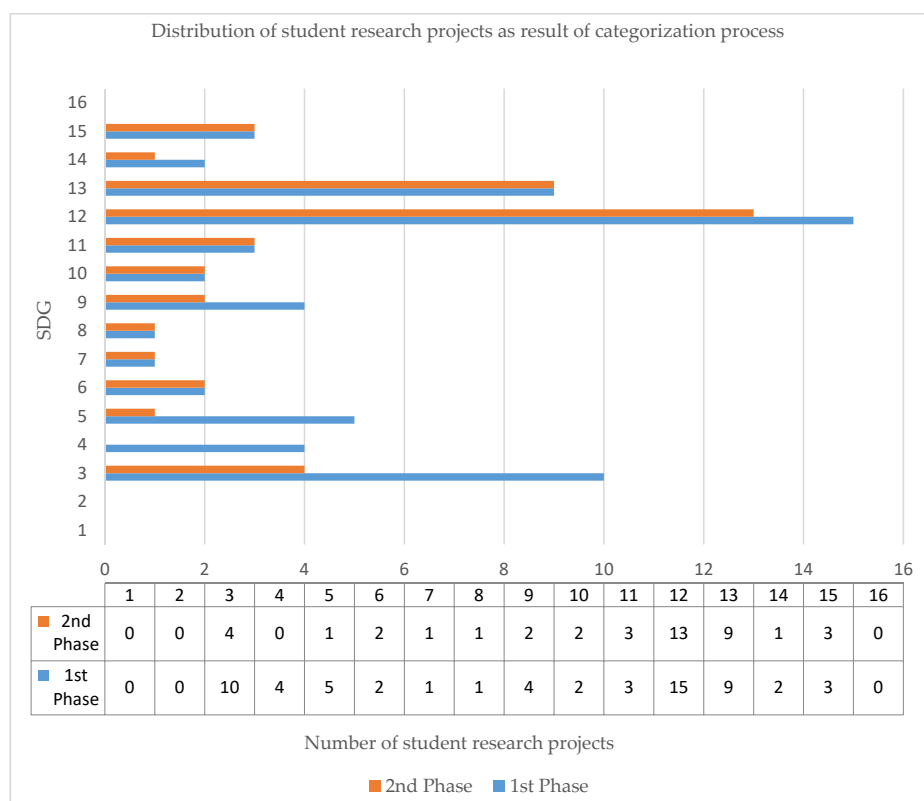


Figure 2. Results obtained from the analysis by categorization by SDG and “targets”.

As for why each group chose a particular problem, one of the most conveyed motivations, regardless of choice, is that it “is not given the importance it truly deserves”, consequently alluding to the lack of awareness on the subject. This, in fact, represents a fairly generalized focus: they inquire about a topic to acquire awareness of the topic while also acquiring knowledge and information; please read the following quotes:

Due to the lack of awareness regarding nutrition (G-53, SDG 3);

One of the reasons why we have chosen this particular topic is the little information and education we have on it and that is why we wanted to go deeper into it (G-39, SDG 7);

We are not truly aware of the serious damage that we cause by simply throwing a bag into the sea or by leaving plastic bottles on the beach, etc. (G-49, SDG 14);

We found this topic [child slavery] very motivating because there are very few people who are truly aware of it. Occasionally, the media talk and inform society about how child slavery still exists today and how, much of the textile that we use, has been sewn and manufactured by them during never-ending working days, receiving a minimum wage and under terrible working conditions. (. . .) We believe that it is essential to raise awareness among young people and adults on this issue (G-18, SDG 8; square brackets included by authors).

Regarding the need to acquire awareness and training, some works also include reasons that stem from the professional standpoint of preservice teachers who, in the future, will raise this awareness inside their own students and so, researching such topics, will allow them to “show to boys and girls the consequences that pollution has on people’s health, so that from the very first moment they can be conscious.” (G-57, SDG 3).

Another widespread reason given for the choice of topic is its actuality—they consider the media coverage that a topic receives, which highlights its relevance, a good reason for making that choice. This happened mainly for topics related to SDGs 12, 13, 14, and 15. Considering basic necessities or essential elements for life is also mentioned as another motivation; this can be the case of energy or water in fact we can read:

It seems to us a matter of first necessity and one of the most important socio-environmental phenomena since it is a natural resource [water] without which we could not live. It is also directly related to climate change because a large part of the water has been contaminated and is no longer available as water for human consumption. (G-36, SDG 6) (square bracket included by authors);

We have chosen the topic of marine pollution also because of the many news that we have seen on television, radio, newspapers or even on the most used social networks. (G-49, SDG 14).

Interest in a particular topic can spark from personal experience or that of someone close. This is true for the SDGs related to health, consumption, or life below water. In line with this reason, as well as to complement it, the daily nature of a problem is also a source of interest, as is the case when dealing with problems like way of life (SDG 11); responsible consumption in the textile industry (SDG 9 and 12); use of plastics, of fertilizers, of menstrual cups; etc.: some quotes are:

In large cities and tourist areas such as Seville [their zone] there is an excess of noise due to a large number of human activities such as transport, constructions, industries, entertainment venues, etc. (G-50, SDG 12);

Currently there is an excessive daily usage of plastic, which has been normalised, in products for which it is not necessary or can be substitutable. (G2.2, SDG 12);

We have chosen this theme since, nowadays, the consumption of clothing has exploded as they are no longer acquired out of necessity, but rather for pleasure or out of whim and compulsiveness. Furthermore, there is little to no information at our disposal about the social and environmental impact that this entails (G-56, SDG 9).

In the following sections, we will present the results of our study according to the categorization process. First, we will analyze those that, although containing topics from the list of SDGs, were not developed according to their perspectives, and then, those that are linked to some of their targets.

3.1. Projects Centered on SDGs But without Focus on Their Targets

In research, the absence of data is data in itself. As such, it seemed relevant to present also those topics that the students set out to research but that were discarded because, despite being related to one of the SDGs, they did not relate to any of their targets. Their classification is shown in Table 1; they have been ordered by SDG. This set of works contains all those that initially addressed issues related to education (SDG 4), some of those related to health and well-being (SDG 3), gender equality (SDG 5), clean water and sanitation (SDG 9), project and responsible consumption (SDG 12), and life below water (SDG 14).

Table 1. Socio-environmental issues and problems that were ruled out in phase 2.

Category: SDG	Problem-Question Researched
3. Good Health and Well-Being	G-3 How does palm oil affect the health of children? G-1 How does noise pollution affect the quality and quantity of sleep? G-17 How does noise pollution affect our health? G-28 What is the reason for the increase in food intolerances today? G-58 Are we aware that low-calorie foods are not as healthy as they seem? G-60 Why is palm oil believed to be harmful?
4. Quality Education	G-47 What do families and teachers think of homework? G-49 The need to add a nurse to the staff of educational centers G-50 The use of technology in the early childhood classroom G-59 Are teachers in Spanish schools made aware of and trained on how to treat a transsexual child?
5. Gender Equality	G-20 Are children's toy catalogs sexist? G-21 Does advertising convey sexist values? G-29 What does society think about the fact that there are baby changers only in women's toilets?
9. Industry, Innovation, and Infrastructures	G-34 Are chemical fertilizers an advance or a hinder for society and the environment? G-41 What is coltan and what are the effects of its exploitation?
12. Responsible Consumption and Production	G-30 Is there a high consumption of ultra-processed in children's breakfasts? G-12 What are children's menus like nowadays?
14. Life Below Water	G-25 Is society aware of the socio-environmental consequences caused by the invasion of the Asian seaweed?

Group nomenclature: G-X = Group number X.

The projects centered on the topic of health and well-being (SDG 3) revolve around issues that are far from the targets towards which the SDGs gravitate. We found that the students that author these works were focused on problems such as noise pollution and its impact on sleep deprivation or health in general (G-1 and G-17), palm oil and its reputation for being harmful to health (G-3 and G-60), the reason behind the increase of food intolerances (G-28), or the impact that low-calories foods have on health (G58). Thus, although they address topics related to health and well-being, these works are centered around problems that are typical of the society in which their authors live and are far from the priorities expressed within SDG 3, priorities such as the spread of infectious diseases, poor reproductive health, or high rates of maternal and new-born mortality.

Something similar occurs with the projects categorized under the SDG of education (SDG 4): the students tackle questions very close to their immediate reality, issues that are typical of the context

in which they live and far from the targets set out for this SDG. These works focus on learning the opinions of parents and/or teachers on controversial topics like homework (G47), the addition of a nurse to the staff of educational centers (G49), the use of technologies in early childhood education classrooms (G50), or the training that teachers have when it comes to interacting with transsexual pupils (G59). The students justify in their works the reason for their choice stating that “we have chosen this topic because it is a matter of urgency and a debate that is present in our society” (G16). Thus, focusing on their immediate reality, they do not look beyond and are unable to delve into the targets of SDG 4.

In relation to projects focused on gender equality (SDG 5), although the students addressed issues directly related to it, they did so from a different approach than that intended by the SDG. Two of the works focused on advertising, trying to discover which sexist standards were transmitted, the analysis of television commercials and toy catalogs being the instruments used for these research projects. The last one tried to determine society’s opinion today about the presence of a certain lack of co-responsibility in the care of minors and, if it exists, why it is there. All of these projects had an approach to the SDG that was different from the one defined by its targets.

The projects linked to SDG 9 (industry, innovation, and infrastructure) that were excluded during the second phase of the categorization process were centered on two very specific products: chemical fertilizers (G-34) and coltan (G-41) and analyzed their impact on the environment. Thus, as with the previous cases, despite being related to industry, they did not reflect the spirit of SDG 9.

In relation to the topic of responsible production and consumption (SDG 12), two works that took children’s menus (G-12 and G-30) as objects of study were discarded for approaching it from a descriptive perspective of the menu configuration and its characteristics.

The last work that did not fit into our categorization was linked to the life below water (SDG 14) and studied the degree of awareness and knowledge that the population has about a phenomenon that recently occurred off the Andalusian coast: the invasion of its ecosystem by a foreign species of Asian seaweed. Neither its impact on the marine and coastal ecosystems nor its influence on fishing was analyzed; the topic was treated from a perspective that did not correspond with the targets of SDG 14.

3.2. *Projects Categorized under SDGs and Their Targets*

Figure 3 represents the distribution of the projects that passed the second phase of categorization; it organizes them according to the SDG and the targets that they tackle.

As Figure 3 shows, the topic of responsible production and consumption (SDG 12) is the one with the greatest presence among students’ projects with 31% of the research addressing it. Seven out of 13 works were focused on waste reduction through prevention, recycling, and reuse (target 12.5). Another major point of interest was the production–consumption tandem in relation to the concerns about how to achieve sustainable management and efficient use of natural resources (4 works on target 12.2). Of the two works that we have yet to mention, one was linked to target 12.8, promoting lifestyles in harmony with nature based on training and information, and the other was linked to target 12.c, the rationalization of inefficient fossil fuel subsidies that encourage wasteful consumption (Table 2).

The second most recurring topic, with 22% of the research addressing it, is climate action (SDG 13). Of the eight papers contained in this category, three focused on raising awareness and improving human and institutional capacity to mitigate and adapt to climate change or to reduce its effects (target 13.3). We found two works directly connected to target 13.2, seeking to incorporate measures against climate change into politics and institutions, and another two that fell within target 13.1 focusing on strengthening resilience and the ability to adapt to the risks caused by climate change. Last but not least, we found research centered on underprivileged areas, thus, linked to target 13.b (see Table 3).

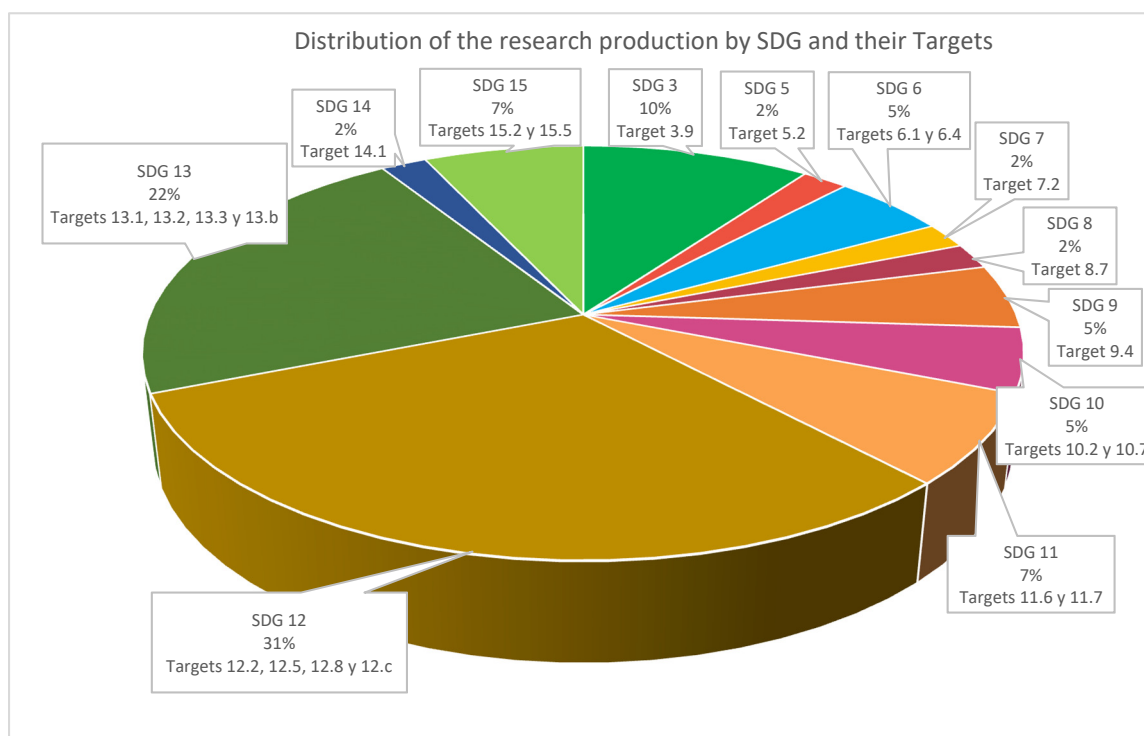


Figure 3. Distribution of the works according to SDG and their targets.

Table 2. Research projects and targets associated with SDG 12.

Category: SDG	Sub-Category: Target	Problem-Question Researched
12. Responsible Production and Consumption	12.2	G-45 How does the project and consumption of palm oil affect society and the environment? G-9 How harmful is palm oil to health and the environment? G-51 What are the consequences of overexploitation of natural resources for both society and the environment? G-48 Are we really aware of the influence of ultra-processed on the environment?
	12.5	G-44 What is the impact of wet wipes’ excessive consumption of on the environment? G-58 What habits do people have for textile reuse and clothing consumption? G-61 How can the menstrual cup reduce the negative impact on the environment? G-47 In the sale of which food products is there an unnecessary use of plastic and how could we avoid it? G-5 Why is it necessary to reduce the massive use of plastics? G-7 Why should we choose glass over plastic? G-8 Does recycling really help decrease climate change? Is society aware of its effects on the environment?
	12.8	G-32 How does excessive consumption of meat affect the environment?
	12.c	G-4 What has the increase in the price of gasoline meant for its consumers?

The remaining projects are classified into various SDGs with percentages, per SDG, equal to or less than 10% (Figure 3). The third most addressed topic was that of health and well-being (SDG 3) with 10% of the researches, all of them linked to target 3.9, focusing on analyzing the consequences that various types of contamination have on our health: G-37—How does air pollution affect respiratory diseases?; G-53—How does pollution influence our diet?; G-57—How does pollution affect people’s health?; G-2—What are the health problems caused by long-term exposure to urban air pollution?

Table 3. Research projects and targets associated with SDG 13.

Category: SDG	Sub-Category: Target	Problem-Question Researched
13. Climate Action	13.1	G-13 Why is temperature so high at this time of year [autumn]? G-59 What impacts does climate change have on animals? G-19 What major changes has the climate undergone in recent years?
	13.2	G-40 What are the consequences of deforestation on the future? G-43 Which problems will the increase in pollution cause for the planet and for people?
	13.3	G-54 What do people think about how deforestation influences climate change? G-33 Which is the main reason for the elevated number of fires in Andalusia? G-10 What level of awareness does society have in relation to the damages that plastic can cause in the environment?
	13.b	G-55 Does climate change influence equally disadvantaged areas and areas with more favorable conditions?

Life on land (SDG 15) was the focus of 7% of the works. These research projects focused on two different targets: the loss of biological diversity and threatened species linked to target 15.5 (G-11—What does the future hold for Arctic fauna?; G-46—Why are bees important for human life?) and the consequences of the Amazon fire linked to target 15.2 (G-38—Which are the consequences and the social impact of the Amazon fire?).

With the same percentage (7%), some projects addressed the topic of sustainable cities and communities (SDG 11). Once again, we found that two different targets had caught the attention of our students: target 11.6, how to reduce the negative impact that cities have on the environment (G-35—How can we minimize noise pollution produced by soccer stadiums built within the city?; G-50—To what extent are people aware of noise pollution?) and target 11.7, how to provide safe and universal access to green areas and public spaces and how to make them safe, inclusive, and accessible (G-26—How do thermal conditions affect the educational community during the teaching and learning process?).

Works related to the SDGs of water, industry, and inequalities (SDGs 6, 9, and 10) are a minority (5%). In the case of clean water and sanitation (SDG 6), the students addressed the problem of water scarcity, target 6.1 (G-36—Water scarcity on our planet, how to make this problem affect as few people as possible?), and questioned the future of this resource, target 6.4 (G-52—In the future, will there be water for everyone and for everything?).

The two projects on industry, innovation, and infrastructure (SDG 9) are related to target 9.4 and are centered on analyzing the environmental impact of the textile and fashion industry (G-42—Is the textile industry a problem for the environment?; G-56—How does the fashion industry affect the environment?).

Regarding the reduction of inequalities (SDG 10), one of the research projects seeks to promote and empower the social, economic, and political inclusion of all people, especially those who encounter difficulties due to their sexual condition, target 10.2 (G-27—Why is the process of revealing sexual orientation/identity so difficult?) and the other tries to delve into the phenomenon of immigration in Spain, target 10.7 (G-6—What is the concern of Spanish society with the arrival of immigrant refugees?).

Finally, issues related to gender equality (SDG 5), affordable and clean energy (SDG 7), decent work and economic growth (SDG 8), and life below water (SDG 14) were addressed by one research project each (2%). In the case of SDG 5, the project was centered on harassment in relationships, target 5.2 (G-31—Are young people aware when they are being harassed by their partners?). On the issue of affordable and clean energy, the results of their research led the students to bet on renewable energies versus fossil fuels, target 7.2 (G-39—Can we continue using fossil fuels at this rate without harming the environment?). On the problem of decent work and economic growth, the work focuses on child slavery that occurs, mainly, in the textile industry, target 8.7 (G-18—Are young people aware of child slavery?).

Finally, on SDG 14, the focus is pollution of the marine ecosystem, target 14.1 (G-49—Pollution caused by plastic in the sea.).

4. Discussion

We believe that our analysis based on categorization by UN Agenda SDGs and their targets together with the size of the sample studied (61 projects of 240 students involved in this study) have the potential to show an “X-ray” of the worries and concerns that preservice teachers have in respect of socio-environmental problems: on the one hand, we can see that their concerns are in line with those established by the UN Agenda, but, on the other hand, the results also show that some problematic issues receive little to no attention. Judging by the results obtained, more than half of the preservice teachers (53%) have focused their interest on responsible production and consumption and on climate action (SDGs 12 and 13, respectively), with the choice of topic mainly centered on the impacts that their own actions may have, with a majority addressing waste reduction. They also allude to the production–consumption model of a society based on excessive consumption and a disproportionate dependence on energy and resources. As for climate change, they appear to be aware of this phenomenon, of its human origin, and its dangerousness [27].

Another group of preservice teachers, almost one-quarter of the sample (24%), also concerned about the impact that climate change has on the environment, focused their research on the consequences that various types of contaminants have for our health (SDG 3), on making cities more sustainable in order to reduce their environmental impact (SDG 11), and on environmental problems of life on land (SDG 15) in terms of loss of biodiversity and deforestation.

By adopting this approach, the students seem to be gradually becoming aware of environmental issues and capable of understanding which repercussions their own actions have on them. Some projects are explicitly related to SDG targets that allude to the needs for promoting a lifestyle in harmony with nature, for training and informing citizens, and for improving awareness and sensitization of the human capacity to mitigate, reduce, and adapt to climate changes. Thus, this perspective of theirs could be employed as a starting point when we try to propose didactic strategies that help expand and dissect these problems.

Preservice teachers have shown less interest in other SDGs: seven of them represent the last 23% of the studied sample. Problems related to water, energy, decent work, industrial development, social inequalities, gender equality, and life below water have turned out to be uncommon choices but the students that opted for these topics have manifested, in their projects, a clearer link between the chosen topic and its social aspects rather than just focusing on its environmental ones.

Furthermore, issues related to poverty, hunger, and peace and justice (SDGs 1, 2, and 16) were not addressed. We admit that, a priori, these may seem complex topics that entail difficulties when considering the context of research projects, but it is of note that these problems were not even perceived or included as consequences or causes of some of the other topics that received the students’ attention (e.g., inquiring about the production model of a society could have led one to consider its social justice, as well). This outcome has to do with the compartmentalized and limited perspective that students usually adopt when tackling issues, the predominance of a simplifying approach to a subject, that is the result, to a certain extent, of the traditional way of addressing its contents (description of events considering few elements as well as few relationships among elements, in a non-systemic way, and establishing simple causal relationships rather than exploring interactions) [28,29].

A possible reason for the absence of this type of issues and also for why some research did not follow a proper approach to the targets of the SDGs (e.g., the projects in respect of education, SDG 4) may be that the students’ perspectives resemble their social context, a context that is characterized, to a large extent, by consumerism, globalization, capitalism, and the “culture of superficiality” [30], whereas the targets of these SDGs are global in nature, based on global challenges that display characteristics that are more imprecise and diffuse [6,31].

Another interesting trend that emerges from our analysis is that students frequently allude to the environmental impact of present-day problems (common to different addressed topics) while, however, leaving the social sphere and its relationship with the environment in the background (the opposite approach seems easier). Undoubtedly, this result is very significant and forces us to raise the need for establishing bridges between social and environmental aspects, to become aware that, as we said at the beginning, they are two sides of the same coin. Therefore, we must continue to train critical citizens of the world, capable of analyzing present-day problems from a complex perspective, where phenomena occur in interaction with one another and, therefore, cannot have simple or unidirectional responses [5,6]. In this sense, the role of interdisciplinarity is essential [32–35] as it is essential for them to adopt a perspective that considers the social, economic, and environmental aspects of present-day problems [36]. Therefore, we consider that the didactic possibilities of working on socio-environmental problems presented in research that sparks from students' interests are many. In other words, it is a type of training strategy that brings preservice teachers closer to socio-environmental problems, making them aware of the most relevant ones on a global scale. It also helps them establish relationships between problems, moving from problems that are solely of a social or environmental nature to interdisciplinary ones; they begin to make their knowledge more complex by connecting them with one other. Even so, we cannot forget that this work is the starting point of a broader educational proposal, in which the teachers consider the initial conceptions of the students essential and need to be linked to the rest of the activities that are presented through the rest of the subjects.

To conclude, as we suggested in the introduction, in line with other studies [37,38], the students are generally not very familiar with the UN Agenda SDGs and, additionally, their experience on the treatment of these SDGs, during training in higher education institutions, is occasional and anecdotal. Therefore, it is necessary to incorporate these types of activities into study plans in order to promote a solid training suitable for present-day challenges, providing a more critical and collective perspective, moving from a local approach to a global one. For this to happen, it is essential to emphasize the need for understanding the interactions that actions have with one another, especially in a globalized world, and to develop a type of action that is collective (thinking and acting as a network) as opposed to individual [39]. Under these premises, it is necessary to work in the educational field on the conceptual barriers associated with the way of perceiving and treating a problem with the same complexity as any of the problems that are presented as a challenge by the UN: it is essential to train citizens that are more resilient and capable of responding to the current eco-social crisis [17].

Author Contributions: Conceptualization, F.R.-M., M.P.G., L.L.-L., and A.G.F.; methodology, M.P.G. and L.L.-L.; validation, F.R.-M., M.P.G., L.L.-L., and A.G.F.; formal analysis, M.P.G. and L.L.-L.; resources, F.R.-M and M.P.G.; data curation, M.P.G. and L.L.-L.; writing—original draft preparation, F.R.-M.; writing—review and editing, L.L.-L.; funding acquisition, F.R.-M., M.P.G., and L.L.-L. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Proyectos de I+D+I en el marco del Programa Operativo FEDER-Andalucía 2014–2020 (Resolución de 23 de marzo de 2018) and University of Granada, under grant number B-SEJ-424-UGR18. This project is called “Sostenibilidad en Educación Superior: Evaluación del alcance de la Agenda 2030 en la innovación curricular y el desarrollo profesional docente en las Universidades Andaluzas”.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Graham, F. Daily Briefing “We are in a State of Planetary Emergency”. *Nature* **2019**. Available online: <https://www.nature.com/articles/d41586-019-03691-1> (accessed on 1 September 2020).
2. Vilches, A.; Gil, D. Una situación de Emergencia Planetaria, a la que Debemos y «podemos» hacer Frente. *Rev. de Educ.* **2009**, 101–122. Available online: <https://dialnet.unirioja.es/servlet/articulo?codigo=3019424> (accessed on 1 September 2020).
3. Worldwatch Institute. *The State of the World*; W.W. Norton: New York, NY, USA, 1984–2017.

4. Steffen, W.; Richardson, K.; Rockström, J.; Cornell, S.E.; Fetzer, I.; Bennett, I.M.; Biggs, R.; Carpenter, S.R.; de Vries, W.; de Wit, C.A.; et al. Planetary boundaries: Guiding human development on a changing planet. *Science* **2015**, *347*, 736–747. [CrossRef]
5. García Pérez, F.F.; Moreno Fernández, O.; Rodríguez Marín, F. Problemas del mundo y educación: Hacia una ciudadanía planetaria. In *Novi Cives. Cittadini dall'infanzia in poi*; Borghi, B., García Pérez, F.F., Moreno-Fernández, O., Eds.; Pàtron Editore: Bologna, Italy, 2015; pp. 33–41.
6. Moreno Crespo, P.; Moreno Fernández, O. Problemas socioambientales: Concepciones del profesorado en formación inicial. *Andamios* **2015**, *12*, 73–96. [CrossRef]
7. Meira Cartea, P.A. De los Objetivos de Desarrollo del Milenio a los Objetivos para el Desarrollo Sostenible: El rol socialmente controvertido de la educación ambiental. *Educ. Soc. Rev. d'Intervenció Socioeducativa* **2015**, *61*, 58–73.
8. ONU. *The Sustainable Development Goals Report*; United Nations: New York, NY, USA, 2020.
9. Puig Gutiérrez, M.; Morales Lozano, J.A. La formación de ciudadanos: Conceptualización y desarrollo de la competencia social y cívica. *Educ. XXI* **2015**, *18*, 259–282. [CrossRef]
10. Kemp, P. *Citizen of the World: The Cosmopolitan Ideal for the Twenty-First Century*; Prometheus: New York, NY, USA, 2011; p. 297.
11. Kioupi, V.; Voulvoulis, N. Education for sustainable development: A systemic framework for connecting the SDGs to educational outcomes. *Sustainability* **2019**, *11*, 6104. [CrossRef]
12. Boyer, E.L. *Una Propuesta Para la Educación Superior del Futuro*; Universidad Autónoma Metropolitana Azcapotzalco: Mexico City, Mexico, 1997; p. 163.
13. Albareda Tiana, S.; Vidal Raméntol, S.; Pujol Valls, M.; Fernández Morilla, M. Holistic approaches to develop sustainability and research competencies in pre-service teacher training. *Sustainability* **2018**, *10*, 3698. [CrossRef]
14. CRUE. Directrices para la Introducción de la Sostenibilidad en el Curriculum. Available online: https://www.crue.org/Documentos%20compartidos/Declaraciones/Directrices_Sostenibilidad_Crue2012.pdf (accessed on 1 September 2020).
15. García González, E.; Jiménez Fontana, R.; Azcarate, P. HAMS: Una herramienta para el análisis de la actividad metodológica del profesorado universitario desde los principios de sostenibilidad y complejidad. *Rev. Espac.* **2018**, *39*, 28.
16. Universidad de Sevilla. *Estatuto de la Universidad de Sevilla*; BOUS: Sevilla, Spain, 2008; p. 70.
17. García Díaz, E.; Fernández Arroyo, J.; Rodríguez Marín, F.; Puig Gutiérrez, M. Más allá de la sostenibilidad: Por una Educación Ambiental que incremente la resiliencia de la población ante el decrecimiento. *Rev. Ed. Amb. Sost.* **2019**, *1*, 1101–1115. [CrossRef]
18. Girault, Y.; Sauvé, L. L'Éducation à l'environnement ou au développement durable. *Aster* **2008**, *46*, 7–30.
19. Naredo, J.M. *Raíces Económicas del deterioro Ecológico y Social: Más ALLÁ de los Dogmas*; Siglo XXI de España Editores, S.A.: Madrid, Spain, 2006; p. 302.
20. García Pérez, F.F. Ciudadanía participativa y trabajo en torno a problemas sociales y ambientales. In *Una Mirada al Pasado y un Proyecto de Futuro: Investigación e Innovación en Didáctica de las Ciencias Sociales*; Pagès, J., Santisteban, A., Eds.; Universitat Autònoma de Barcelona y Asociación Universitaria de Profesorado de Didáctica de las Ciencias Sociales: Barcelona, Spain, 2014; Volume 1, pp. 119–126.
21. Zamora Polo, F.; Sánchez Martín, J.; Corrales Serrano, M.; Espejo Antúnez, L. What do university students know about sustainable development goals? A realistic approach to the reception of this UN program amongst the youth population. *Sustainability* **2019**, *11*, 3533. [CrossRef]
22. Lozano, R.; Merrill, M.Y.; Sammalisto, K.; Ceulemans, K.; Lozano, F.J. Connecting competences and pedagogical approaches for sustainable development in higher education: A Literature Review and Framework Proposal. *Sustainability* **2017**, *9*, 1889. [CrossRef]
23. Ideland, M. *The Eco-Certified Child. Citizenship and Education for Sustainability and Environment*; Palgrave Macmillan: Cham, Switzerland, 2019.
24. Rocard, M. *Science Education NOW: A Renewed Pedagogy for the Future of Europe*; European Commission: Brussels, Germany, 2007; p. 23.
25. Creswell, J.W. *Qualitative Inquiry and Research Design: Choosing among Five Approaches*, 4th ed.; Sage Publications: California, CA, USA, 2013.

26. ONU. *Transformar Nuestro Mundo: La Agenda 2030 para el Desarrollo Sostenible*; Naciones Unidas: New York, NY, USA, 2015.
27. Heras, F.; Meira, P.A. Cuando lo importante no es relevante. La sociedad española ante el cambio climático. *Pap. de Relac. ecosociales y cambio Glob.* **2016**, *136*, 43–53.
28. Morin, E. *Introducción al Pensamiento Complejo*; Gedisa: Barcelona, Spain, 1994.
29. García Díaz, J.E. Los Contenidos de La Educación Ambiental: Una Reflexión Desde La Perspectiva de La Complejidad. *Investig. en la Esc.* **2004**, *53*, 31–51.
30. García Pérez, F.F.; De Alba Fernández, N. ¿Puede la escuela del siglo XXI educar a los ciudadanos y ciudadanas del siglo XXI? *Scr. Nova Rev. Elect. de Geo. y CCSS* **2008**, *12*, 122.
31. Gómez Gil, C. Objetivos de Desarrollo Sostenible (ODS): Una Revisión Crítica. *Pap. Relac. EcoSociales y Cambio Glob.* **2017**, *140*, 107–118.
32. Kysilka, M.L. Understanding integrated curriculum. *Curric. J.* **1998**, *9*, 197–209. [[CrossRef](#)]
33. Dale, A.; Newman, L. Sustainable development, education and literacy. *Int. J. Sustain. High. Educ.* **2005**, *6*, 351–362. [[CrossRef](#)]
34. Luppi, E. Training to education for sustainable development through e-learning. *Proc. Soc. Behav. Sci.* **2011**, *15*, 3244–3251. [[CrossRef](#)]
35. Colucci-Gray, L.; Perazzone, A.; Dodman, M.; Camino, E. Science Education for Sustainability, Epistemological Reflections and Educational Practices: From Natural Sciences to Trans-Disciplinarity. *Cult. Stud. Sci. Educ.* **2013**, *8*, 127–183. [[CrossRef](#)]
36. Annan Diab, F.; Molinari, C. Interdisciplinarity: Practical approach to advancing education for sustainability and for the Sustainable Development Goals. *Int. J. Manag. Educ.* **2017**, *15*, 73–83. [[CrossRef](#)]
37. Alba Hidalgo, D.; Benayas del Álamo, J.; Blanco, N. REDS. Guía cómo evaluar los ODS en las universidades. 2020. Available online: <https://reds-sdsn.es/wp-content/uploads/2020/04/Gui%CC%81a-COMO-EVALUAR-ODS-2020-AAFF.pdf> (accessed on 1 September 2020).
38. Gil-Pérez, D.; Vilches, A. La comprensión e impulso de la Sostenibilidad: Un requisito imprescindible para una acción educativa y ciudadana eficaz. *Rev. Educ. Ambient. Sostenibilidad.* **2019**, *1*, 2101. [[CrossRef](#)]
39. Valdor, P.; Gracia, A.; Quevedo, N. Red Cambera. Investigación Social de la Percepción del Cambio Climático en España. 2019. Available online: https://red4c.es/wp-content/uploads/2020/03/percepcionCC_red4C.pdf (accessed on 1 September 2020).



© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).